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टी वी पिक्चर ट्यूबों के साथ प्रयुक्त विक्षेपक क्वायल इकाइयों की विशिष्टि

भाग 5 रंगीन पिक्चर ट्यूबों के लिए विक्षेपक क्वायल इकाइयाँ

Indian Standard

SPECIFICATION FOR DEFLECTION COIL UNITS USED WITH TV PICTURE TUBES

PART 5 DEFLECTION COIL UNITS FOR COLOUR PICTURE TUBES

ICS 33.160.20; 33.120.01

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BUREAU OF INDIAN STANDARDS
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NEW DELHI 110002

September 1998

Price Group 4

Magnetic Components and Ferrite Materials Sectional Committee, LTD 13

FOREWORD

This Indian Standard (Part 5) was adopted by the Bureau of Indian Standards, after the draft finalized by the Magnetic Components and Ferrite Materials Sectional Committee had been approved by the Electronics and Telecommunication Division Council.

The object of this standard is to lay down general and performance requirements for deflection coil units (also popularly known as deflection yoke and hereinafter referred as DY) to be used with colour picture tube (CPT) in television receivers. The limits of performance have been so chosen to provide general guidance to manufacturers of deflection yokes and at the same time ensure sufficient freedom in design.

This Indian Standard shall be read in conjunction with IS 9187 (Part 1) : 1979 'Specification for deflection coil units used with TV picture tubes: Part 1 General requirements and tests'.

This standard (Part 5) is one of the parts of IS 9187 series of standards on specification for deflection coil units used with TV picture tubes. The other parts of this series are as follows:

(Part 1) : 1979	General requirement and test
(Part 2) : 1979	Type DCU 1S for 470 mm, 510 mm, 590 mm and 610 mm TV picture tubes
(Part 3) : 1980	Type DCU 1H for 470 mm, 510 mm, 590 mm and 610 mm TV picture tubes
(Part 4) : 1979	Type DCU 2S for 310 mm and 340 mm TV picture tubes

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the results of a test or analysis, shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

SPECIFICATION FOR DEFLECTION COIL UNITS USED WITH TV PICTURE TUBES

PART 5 DEFLECTION COIL UNITS FOR COLOUR PICTURE TUBES

1 SCOPE

This standard (Part 5) covers the general and performance requirements for Deflection Yokes (DY) designed for use with CTV receivers conforming to IS 10662.

2 REFERENCES

The Indian Standards listed in Annex A are necessary adjuncts to this standard.

3 TERMINOLOGY

For the purpose of this standard, the terms and definitions covered in IS 1885 (Part 24) and IS 9187 (Part 1) shall apply.

4 GENERAL REQUIREMENTS

4.1 The Deflection Yokes should be suitable for CPT with IN-LINE GUN, neck diameter 29.1 mm/ 22.5 mm, size 510 mm, 90° deflection angle.

4.2 The saddle-shaped horizontal coils shall be mounted on moulded case (moulded from material like polypropylene with suitable additives) so that the deflection centre shall be well within the conical part of the picture tube. The vertical coils shall be wound on a semi-toroid ferrite ring, housed in a semi-rigid housing, which is flared so that the frame and line deflection centers coincide. The relative positions of the frame and line deflection coils are so adjusted that their fluxes are at right angle to each other.

4.3 Static convergence and centering magnets shall be provided.

4.4 Yoke winding ends shall be terminated on suitable terminals. The solderability of terminals shall be according to IS 9000 (Part 18/Sec 1).

4.5 Vertical windings shall be available on terminals in such a manner that there is option for series and parallel connections.

5 ELECTRICAL REQUIREMENTS

The electrical requirements shall be as specified in Table 1.

Table 1 Electrical Parameters

Sl No. (1)	Parameter (2)	Requirement (3)
i)	Inductance (Preferred values) at 1KHz:	
	a) Horizontal coils	1.93 mH ± 3%
	b) Vertical coils	28.5 mH ± 10% or 110.0 mH ± 10%
ii)	Resistance (Preferred values):	
	a) Horizontal coils	2.2 ohms ± 10%
	b) Vertical coils	14.0 ohms ± 5% or 56.0 ohms ± 5%
iii)	Deflection current for full scan with reference to above preferred values (measured with 25kV EHT and reference CPT):	
	a) Horizontal	3.0 A ± 10%
	b) Vertical	0.8 A ± 10%
iv)	Raster distortion measured without correction magnets and with reference (CPT)	
	a) Pin cushion distortion (*see* Fig. 1):	
	Top-bottom $\frac{2(a+b)}{AC+BD} \times 100$	Less than 1.5%
	Left-right	$\frac{2(c+d)}{AB+CD} \times 100$ Less than 1.5%
	b) Trapezoid distortion (*see* Fig. 1):	
	Top-Bottom	$\frac{AC-BD}{AC+BD} \times 100$ Less than 2.0%
	Left-Right	$\frac{AB-CD}{AB+CD} \times 100$ Less than 2.0%

Table 1 (*Concluded*)

Sl No. (1)	Parameter (2)	Requirement (3)
c)	Parallelogram distortion (*see* Fig. 1)	1 degree (*Max*) for vertical 1.5 degree (*Max*) for horizontal

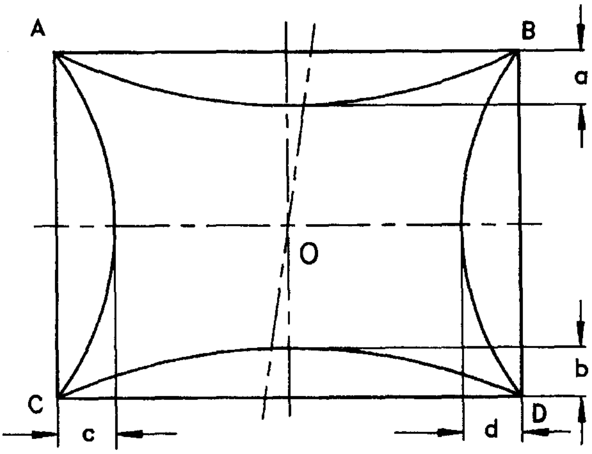


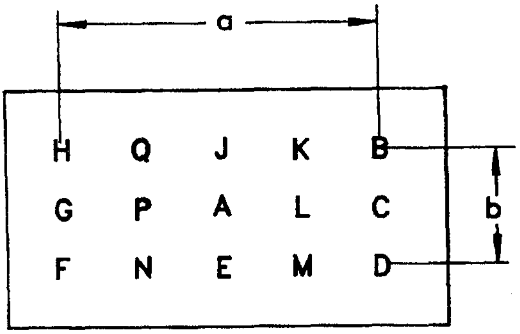
FIG. 1

v) Cross talk — With 10 V, 15 625 Hz applied to horizontal coil, induced voltage on vertical coil shall be less than 200 mV.

vi) Convergence test — Measured under the conditions that vertical and horizontal seen cover *EJ* and *CG* (*see* Fig. 2) and the chassis operating at the rated line voltage using a reference (CPT).

Misconvergence measured for Red, Blue and Green should be within following limits (all values in mm).

Test Points				*Maximum Value*	
				H	*V*
	C	*G*		0.8	0.5
	E	*J*		0.6	0.5
	L	*P*		0.3	0.2
K	*M*	*N*	*Q*	0.8	0.8
B	*D*	*F*	*H*	1.2	1.0



A - RGB TRIO
a - 360 mm
b - 260 mm
Spot size - 10 mm diameter

FIG. 2

vii) Purity — At normal viewing, there should not be any visible colour patches on the screen of any colour.

viii) Raster size (measured with 25 kV ERT, 1mA beam current and reference CPT)

Horizontal	Standard ± 5 mm
Vertical	Standard ± 5 mm

ix) Voltage proof test — There shall be no breakdown or flashover at 2.5 kV rms, 40 Hz applied for one minute between any winding or yoke and ground except vertical winding and core.

There shall be no breakdown or flashover at 1.5 kV rms, 50 Hz applied for one minute between vertical winding and core.

x) High voltage, high frequency test for horizontal coil.

xi) Testing details to be agreed between manufacturer and user. Typical values are 2 kV, 100 KHz for 3 s.

6 MECHANICAL REQUIREMENTS

6.1 Dimensions

To be specified by the manufacturer.

6.2 Mounting

Profile and dimensions of the yoke should be such that the yoke is free to move up and down, side-wise and back to front for alignment of raster. The yoke is to be fixed on the CPT with wedges and sealing compound and screw tightened clamping ring.

7 SAFETY REQUIREMENTS

7.1 Insulation Resistance

Insulation resistance R shall be:

a) more than 1 000 M ohms — between line coil and field coil
b) more than 1 000 M ohms — between line coil and core clamp
c) more than 1 000 M ohms — between field coil and core clamp at 500 V dc applied for one minute.

7.2 Flammability

The DY shall meet the self-extinguishing and nondripping requirements of IS 11000 (Part 2/Sec 2). The durations of application of flame and burning shall be 10 s and 50 s respectively. The test specimen shall not drip flaming particles and ignite the dry absorbent surgical cotton located 305 mm below test specimen.

8 MARKING REQUIREMENTS

8.1 Each yoke shall be legibly and indelibly marked at least with the following information in code or otherwise:

a) Manufacturer's name or trade-mark,
b) Model designation and batch No.,
c) Terminal identification,
d) Country of origin, and
e) Week/Month and year of manufacture.

The markings shall be such as not to become illegible while in storage and during service through normal handling. The sticker if used, should be of non-conductive material and shall not deteriorate any performance parameter of DY.

9 ENVIRONMENTAL/ENDURANCE REQUIREMENTS

9.1 Robustness of Termination

All terminals shall be subjected to tensile strength test in accordance with IS 9000 (Part 19/Sec 1) by applying a force of 10 Newton for 10 ± 1 s.

9.2 Vibration Test

The test shall be carried out in accordance with IS 9000 (Part 8). The vibration severity should be 10 to 150 Hz with amplitude of 20 m/s^2 for a total duration of six hours (2 hours each on three principal axes).

9.3 Bump Test

The test shall be carried out in accordance with IS 9000 (Part 7/Sec 2) taking care that terminals are not stressed and that equal number of samples are bumped in each of three principal axes. Samples shall be subjected to 1 000 bumps of 400 m/s^2 along each axis.

9.4 Dry Heat Test

The test shall be carried out in accordance with IS 9000 (Part 3/Sec 3) for a duration of 16 hours.

The temperature of test chamber shall be maintained at +70°C. The DY shall be on full load during the exposure of 16 hours. The recovery period shall be one and half hour.

9.5 Damp Heat Cyclic Test

The test shall be carried out in accordance with IS 9000 (Part 5/Sec 1). The DY shall be subjected to two cycles of 12 hours each of damp heat test, at 40°C and 95 percent relative humidity severity. The duration of recovery period shall be one and half hour.

9.6 Cold Test

The DY shall be subjected to cold test for 2 hours at −10°C in accordance with IS 9000 (Part 2/Sec 3).

9.7 Damp Heat (Steady State) Test

The DY shall be subjected to damp heat (Steady state) test for a period of 21 days in accordance with IS 9000 (Part 4).

9.8 Endurance (Electrical) Test

The DY shall be mounted in accordance with detailed specifications as per IS 9185 (Part 1). The winding shall be loaded at 1.2 times its rated voltage and current. The test shall be carried out at 55 ± 2°C for a duration of 96 hours.

10 GENERAL CONDITIONS FOR MEASUREMENTS

10.1 Ambient Conditions of Measurements

Unless otherwise specified, all the measurements shall be carried out under the following normal ambient conditions as per IS 9000 (Part 1):

Temperature	15 to 35°C
Relative humidity	45 to 75 percent
Air pressure	8.6 kPa to 10.6 kPa

10.2 Reference Conditions of Measurements

In case where the characteristics are sensitive to ambient conditions, the following referee conditions shall be maintained during the measurements:

Temperature	25 ± 3°C
Relative humidity	55 ± 5 percent
Air pressure	8.6 kPa to 10.6 kPa

10.3 Methods of Tests

Methods of tests, wherever applicable, shall be according to Annex B.

11 TESTS

11.1 Classification of Tests

11.1.1 *Type Tests*

The tests specified in Table 2 shall constitute type tests in the sequence mentioned therein.

11.1.1.1 *Number of samples*

For type tests, ten samples shall be selected preferably at random from a regular production lot and shall be subjected to various tests as specified in Table 2.

Table 2 Schedule of Type Tests
(*Clauses* 11.1.1 *and* 11.1.1.1)

Group (1)	Test (2)	Clause No. (3)	Number of Samples (4)
0	General requirement	4	10
	Electrical requirements	5	
	Mechanical requirements	6	
	Insulation resistance	7.1	
	Marking requirements	8	
1	Solderability	4.4	3
	Robustness of termination	9.1	
	Bump test	9.3	
	Vibration test	9.2	
	Dry heat	9.4	
	Damp heat (first cycle)	9.5	
	Cold test	9.6	
	Damp heat (second cycle)	9.5	
2	Damp heat (steady state)	9.7	3
3	Flammability	7.2	1
4	Endurance test	9.8	3

The following tests shall be carried out after group 1, 3 and 4 of test and performance requirements should be met:

a) Visual examination,
b) Functional check,
c) Insulation resistance,
d) Breakdown voltage, and
e) Convergence.

11.1.1.2 *Criteria of acceptance*

There shall be no single failure in any of the type tests. In case of failure, twice the number of samples shall be taken and subjected to the tests in which failure has occurred and other tests that have bearing on the test results. No failure shall be permitted in the retests.

11.1.2 *Routine Tests*

The following shall constitute the routine tests and shall be carried on each and every Deflection Yoke:

a) Visual examination,
b) Inductance,
c) Resistance,
d) Cross talk,
e) Raster distortion,
f) Convergence, and
g) Voltage proof tests.

11.1.3 *Acceptance Tests*

The following shall constitute the acceptance tests which shall be carried out on DYs that have successfully passed routine tests:

a) Visual examination, and
b) Insulation resistance.

11.1.3.1 Samples shall be selected and subjected to acceptance tests to ascertain the conformity of each lot to the requirement specified. A recommended sampling plan and acceptance criteria is given in Annex C.

ANNEX A

(*Clause* 2)

LIST OF REFERRED INDIAN STANDARDS

IS No.	*Title*
2 : 1960	Rules for rounding off numerical values (*revised*)
1885 (Part 24) : 1967	Electrotechnical vocabulary : Part 24 Broadcasting sound and television
4545 (Part 3) : 1983	Methods of measurement on receivers for television broadcast transmissions: Part 3 Geometrical properties of the picture
4905 : 1968	Methods for random sampling
9000	Basic environmental testing procedures for electronic and electrical items:
(Part 1) : 1988	General
(Part 2/Sec 3) : 1977	Cold test, Section 3 Cold test for non-heat dissipating items with gradual change in temperature
(Part 3/Sec 3) : 1977	Dry heat test, Section 3 Dry heat test for non-heat dissipating items with gradual change in temperature
(Part 4) : 1979	Damp heat (steady state)
(Part 5/Sec 1) : 1981	Damp heat (cyclic) test, Section 1 16+18 h cycle
(Part 8) : 1981	Vibration (sinusoidal) test
(Part 18/Sec 1) : 1981	Solderability test, Section 1 Solderability of wire and tag terminations
(Part 19/Sec 1) : 1986	Test for robustness of terminations and integral mounting devices, Section 1 Tensile test
9185 (Part 1) : 1979	Endurance (life) test for electronic and electrical components — Thermal endurance
9187 (Part 1) : 1979	Deflection coil units used with TV picture tubes: Part 1 General requirements and tests
10662 : 1992	Receivers for colour television broadcast transmission (*first revision*)
11000 (Part 2/ Sec 2) : 1984	Fire hazard testing : Part 2 Test method, Section 2 Needle flame test

ANNEX B

(*Clause* 10.3)

METHODS OF TESTS

B-0 GENERAL

The object of the tests covered herein is to provide uniform and repeatable procedures for carrying out measurements on deflection yokes (DYs).

B-1 GENERAL CONDITIONS OF MEASUREMENTS

B-1.1 Assumptions

B-1.1.1 All test equipment has been properly calibrated.

B-1.1.2 Adequate warming up time has been allowed.

B-1.1.3 In case the impedance of the DY and the test equipment do not match, suitable matching networks have been used. (Necessary compensation for insertion loss shall be taken into consideration.)

B-2 PROCEDURE FOR MEASURING VARIOUS PARAMETERS

B-2.1 Continuity of Windings

It shall be carried out in accordance with **7.4.2** of IS 9187 (Part 1).

B-2.2 DC Resistance

It shall be carried out in accordance with **7.4.3** of IS 9187 (Part 1).

B-2.3 Inductance

It shall be carried out using Digital LCR Bridge at 1 kHz in accordance with **7.4.4** of IS 9187 (Part 1).

B-2.4 Deflection Current for Full Scan

It shall be carried out in accordance with **7.4.5** of IS 9187 (Part 1). A Pattern Generator capable of providing identification markings of the picture boundaries as per CCIR standard shall be used.

B-2.5 Distortion (Pin Cushion, Trapezoidal and Parallelogram) and Raster Size

It shall be carried out in accordance with **7.4.6** of IS 9187 (Part 1).

B-2.6 Convergence

It shall be carried out in accordance with **6** of IS 4545 (Part 3).

B-2.7 Purity

B-2.7.1 Align the DY with CPT and connect the assembly to the chassis of the CTV receiver. Energize the CTV receiver chassis with proper power supply.

B-2.7.2 Feed pure colour signal (say red) and observe on the CTV screen for the visible colour patches.

B-2.7.3 Repeat the procedure for green and blue colour signals.

B-2.8 Voltage Proof Test

It shall be carried out in accordance with **7.4.7** of IS 9187 (Part 1) by providing appropriate voltages as specified in the specifications.

B-2.9 High Voltage, High Frequency Test for Horizontal Coil

B-2.9.1 Connect the horizontal coil of DY to the signal of requisite voltage and frequency.

B-2.9.2 Switch on the supply and observe.

B-2.10 Insulation Resistance

It shall be carried out in accordance with **7.4.8** of IS 9187 (Part 1) by providing appropriate voltages as specified in the specifications.

ANNEX C

(*Clause* 11.1.3.1)

SAMPLING PLAN AND CRITERIA FOR CONFORMITY

C-1 LOT

C-1.1 All the DYs of the same model and type having the same design and manufactured by the same technique under essentially similar conditions of production.

C-1.1.1 Samples shall be taken and tested to ascertain the conformity of each lot for acceptance tests.

C-2 SCALE OF SAMPLING

C-2.1 DYs shall be taken at random according to col 2, 3 and 4 of Table 5 in accordance with IS 4905.

C-3 NUMBER OF TESTS AND CRITERIA FOR CONFORMITY

C-3.1 DYs shall be drawn from each lot according to col 2 and 3 of Table 3 and subjected to the acceptance test specified in **11.1.3**. If a DY fails in any one of the acceptance tests, it shall be called a defective. If the number of defectives found in the first sample (*see* col 3) is zero (*see* col 6), the lot can be considered as conforming to the acceptance tests. If the number of defectives is as equal to or greater than two (*see* col 7), the lot shall be considered as not conforming to the acceptance.

C-3.2 If the number of defectives is equal to one, further samples of DYs shall be taken according to col 4 of Table 3 and tested for all the acceptance tests. If the number of defectives in the combined sample (*see* col 5) is less than two (*see* col 7), the lot shall be considered as conforming to the acceptance tests; otherwise rejected.

Table 3 Sampling Plan for Deflection Yokes

(*Clauses* C-3.1 *and* C-3.2)

Sl No.	**Lot Size**	**First Sample** ($N1$)	**Second Sample** ($N2$)	**Combined Sample** ($N1+N2$)	**Acceptance Number**	**Rejection Number**
(1)	(2)	(3)	(4)	(5)	(6)	(7)
i)	Up to 150	5	5	10	0	2
ii)	151 to 300	8	8	16	0	2
iii)	301 and above	13	13	26	0	2

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